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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/666,892	09/17/2003	Hong-Yi Hubert Chen	MP0393	9088

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EXAMINER	
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ART UNIT	PAPER NUMBER
2186	

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Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary	Application No.	Applicant(s)	
	10/666,892	CHEN ET AL.	
	Examiner	Art Unit	
	Hetul Patel	2186	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE *03* MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

1)☒ Responsive to communication(s) filed on *26 July 2006*.

2a)☒ This action is **FINAL**. 2b)☐ This action is non-final.

3)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

4)☒ Claim(s) *1-26 and 51-85* is/are pending in the application.

4a) Of the above claim(s) *27-50* is/are withdrawn from consideration.

5)☐ Claim(s) _____ is/are allowed.

6)☒ Claim(s) *1-26 and 51-85* is/are rejected.

7)☐ Claim(s) _____ is/are objected to.

8)☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

9)☐ The specification is objected to by the Examiner.

10)☐ The drawing(s) filed on _____ is/are: a)☐ accepted or b)☐ objected to by the Examiner.

Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).

11)☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

12)☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

a)☐ All b)☐ Some * c)☐ None of:

1.☐ Certified copies of the priority documents have been received.

2.☐ Certified copies of the priority documents have been received in Application No. _____.

3.☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

1) ☐ Notice of References Cited (PTO-892)
2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
3) ☐ Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08) Paper No(s)/Mail Date _____.
4) ☐ Interview Summary (PTO-413) Paper No(s)/Mail Date. _____ .
5) ☐ Notice of Informal Patent Application (PTO-152)
6) ☐ Other: _____.

DETAILED ACTION

1. This Office Action is in response to the communication filed on July 26, 2006. Claims 27-50 are cancelled and claims 1-2, 5, 8, 14-15, 18, 21, 51-52, 55, 64-65, 68, 74, 78 and 80-85 are amended. Therefore, claims 1-26 and 51-85 are pending in the application.

Terminal Disclaimer

2. The terminal disclaimer filed on July 26, 2006 disclaiming the terminal portion of any patent granted on this application, which would extend beyond the expiration date of any patent granted on Application Number 10/666,892 has been reviewed and is accepted. The terminal disclaimer has been recorded. Accordingly, the double patenting rejection made in the previous office action has been withdrawn.

3. Applicant's arguments filed on July 26, 2006 have been fully considered but they are not deemed to be persuasive.

4. The rejection of claims 1-26 and 51-85 as in the previous Office Action is respectfully maintained and reiterated below for Applicant's convenience.

Claim Rejections - 35 USC § 102

The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

> A person shall be entitled to a patent unless –
>
> (b) the invention was patented or described in a printed publication in this or a foreign country or in public use or on sale in this country, more than one year prior to the date of application for patent in the United States.

5. Claims 1-11, 14-24, 57-58 and 60-85 are rejected under 35 U.S.C. 102(b) as being anticipated by Jaggar (USPN: 5,701,493).

As per claim 1, Jaggar teaches a register file for a data processing system comprising a unbanked memory unit (i.e. the stack memory area) having a plurality of memory locations, each memory location being addressable by an encoded address (i.e. the combination of register address and the mode bits, 17 in Figs. 1 and 8), wherein the encoded address corresponds to at least one register (i.e. registers R0-R13 in Figs. 1 and 8) and processor mode (i.e. a user mode and system mode); input ports (i.e. the input from the read buffer 8 and the input from the internal bus 4 in Figs. 1 and 8) to receive inputs for addressing at least one of the memory locations using an encoded address; and output ports (i.e. the output to write buffer 10 and the output to the internal bus 4 in Figs. 1 and 8) to output data from at least one of the memory locations addressable by an encoded address (e.g. see the abstract and Figs. 1 and 8).

As per claim 2, Jaggar teaches the claimed invention as described above and furthermore, Jaggar teaches that a plurality of registers (i.e. registers R0-R13 in Figs. 1 and 8) correspond to the plurality of memory locations of the unbanked memory unit, i.e. each register corresponds to one or more memory locations depending on the processor mode (e.g. see the abstract).

As per claim 3, Jaggar teaches the claimed invention as described above and furthermore, Jaggar teaches that each register (i.e. registers R0-R13 in Figs. 1 and 8) is

addressable by a corresponding encoded address (i.e. the combination of register address and the mode bits, 17 in Figs. 1 and 8) (e.g. see the abstract and Figs. 1 and 8).

As per claim 4, Jaggar teaches the claimed invention as described above and furthermore, Jaggar teaches that at least two registers are capable of being accessed in different processor modes using the same encoded address, i.e. the system mode re-uses the same set of registers as the user mode (e.g. see the abstract).

As per claim 5, Jaggar teaches the claimed invention as described above and furthermore, Jaggar teaches that the read and write requests need to be redirected whenever the mode is changed, therefore, the plurality of memory locations of the stack memory are discontinuous (e.g. see Col. 6, lines 51-61).

As per claim 6, Jaggar teaches the claimed invention as described above and furthermore, Jaggar teaches that a bit width of the plurality of memory locations (i.e. the stackable memory area) is scalable to any arbitrary bit width size (e.g. see Col. 6, lines 51-61).

As per claim 7, Jaggar teaches the claimed invention as described above and furthermore, Jaggar teaches that inputs (i.e. the input from the read buffer 8 and the input from the internal bus 4 in Figs. 1 and 8) are received associated with at least one register (i.e. "reg add" in Fig. 8) and processor mode (i.e. "mode bits" in Fig. 8), and wherein at least one of the outputs (i.e. output in Fig. 8) is data from a register associated with an encoded address (i.e. the combination of register address and the mode bits, 17 in Fig. 8) obtained from the received inputs (e.g. see Fig. 8).

As per claim 8, Jaggar teaches the claimed invention as described above and furthermore, Jaggar teaches that data is outputted from the unbanked memory unit (i.e. the stackable memory area) for at least two instructions, i.e. two different READ requests/instructions (e.g. see claim 15).

As per claim 9, Jaggar teaches the claimed invention as described above and furthermore, Jaggar teaches that inputs (i.e. the input from the read buffer 8 and the input from the internal bus 4 in Figs. 1 and 8) are received associated with at least one register (i.e. "reg add" in Fig. 8) and processor mode (i.e. "mode bits" in Fig. 8), and wherein one of the inputs is data to be written in a register associated with an encoded address (i.e. the combination of register address and the mode bits, 17 in Fig. 8) obtained from the received inputs (e.g. see Fig. 8).

As per claim 10, Jaggar teaches the claimed invention as described above and furthermore, Jaggar teaches that data for at least two retired instructions (i.e. WB 660 in Fig. 6) is to be written in at least two registers (i.e. via bus 426 in Fig. 6) (e.g. see Fig. 6 and paragraphs [0038]-[0040]).

As per claim 11, Jaggar teaches the claimed invention as described above and furthermore, Jaggar teaches that the register file further comprising an address encoder (i.e. the combination of components 12-20 in Fig. 8) to provide an encoded address (i.e. the combination of register address and the mode bits, 17 in Fig. 8) for accessing one of the plurality of registers (i.e. R0-R15 in Fig. 8) (e.g. see Fig. 8).

As per claims 51, 61, 64, 74, 78 and 80, see argument with respect to the rejection of claim 1. Claims 51, 61, 64, 74, 78 and 80 are also rejected based on the same rationale as the rejection of claim 1.

As per claims 14-24, see arguments with respect to the rejection of claims 1-11, respectively. Claims 14-24 are also rejected based on the same rationale as the rejection of claims 1-11, respectively.

As per claims 52-56, see arguments with respect to the rejection of claims 2-6, respectively. Claims 52-56 are also rejected based on the same rationale as the rejection of claims 2-6, respectively.

As per claim 57, Jaggar teaches the claimed invention as described above and furthermore, Jaggar teaches that each address encoder (i.e. the combination of components 12-20 in Fig. 8) includes input ports (i.e. the input from the read buffer 8 and the input from the internal bus 4 in Figs. 1 and 8) to receive inputs associated with at least one register (i.e. "reg add" in Fig. 8) and processor mode (i.e. "mode bits" in Fig. 8) in providing a corresponding encoded address (e.g. see Fig. 8).

As per claim 58, Jaggar teaches the claimed invention as described above and furthermore, Jaggar teaches that each address encoder (i.e. the combination of components 12-20 in Fig. 8) includes logic circuitry (i.e. the instruction decoder, 14 in Fig. 8) to obtain the corresponding encoded address based on the received inputs (e.g. see Fig. 8).

As per claim 60, Jaggar teaches the claimed invention as described above and furthermore, Jaggar teaches that the processor is at least one of an embedded processor and a microprocessor (i.e. 62 in Fig. 8).

As per claims 62-63 and 67-69, see arguments with respect to the rejection of claims 2-6, respectively. Claims 62-63 and 67-69 are also rejected based on the same rationale as the rejection of claims 2-6, respectively.

As per claims 65-66, see arguments with respect to the rejection of claims 2-3, respectively. Claims 65-66 are also rejected based on the same rationale as the rejection of claims 2-3, respectively.

As per claims 70-73, see arguments with respect to the rejection of claims 57-60, respectively. Claims 70-73 are also rejected based on the same rationale as the rejection of claims 57-60, respectively.

As per claims 75-77 and 79, see arguments with respect to the rejection of claims 8-10 and 8, respectively. Claims 75-77 and 79 are also rejected based on the same rationale as the rejection of claims 8-10 and 8, respectively.

As per claims 81-85, see arguments with respect to the rejection of claims 2-6, respectively. Claims 81-85 are also rejected based on the same rationale as the rejection of claims 2-6, respectively.

Claim Rejections - 35 USC § 103

The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

> (a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negatived by the manner in which the invention was made.

6. Claims 12-13 and 25-26 are rejected under 35 U.S.C. 103(a) as being unpatentable over Jaggar in view of Meier et al. (USPN: 6,363,471) hereinafter, Meier.

As per claims 12 and 13, Jaggar teaches the claimed invention as described above, but failed to teach a latch circuit and a selector as clamed. Meier, however, teaches about using the latch or other clocked storage devices to store the intermediate values for pipelining to the next stage (e.g. see Col. 16, lines 21-35 and Fig. 6). Accordingly, it would have been obvious to one of ordinary skill in the art at the time of the current invention was made to implement Meier's latch circuit in the register file taught by Jaggar. In doing so, this latch circuit can buffer the data (i.e. the encoded addresses) for pipeline storage in case if the data can be reused. The further limitation of having the selector coupled to the latch and the address encoder is well-known and notorious old in the art at the time of the current invention was made. By using the selector, such as a mux, the encoded address can be selected either from the latch circuit or directly from the address encoder based on a select signal.

As per claims 25-26, see arguments with respect to the rejection of claims 12-13, respectively. Claims 25-26 are also rejected based on the same rationale as the rejection of claims 12-13, respectively.

7. Claims 59 are rejected under 35 U.S.C. 103(a) as being unpatentable over Jaggar in view of Rangan et al. (USPN: 6,766,505) hereinafter, Rangan.

As per claim 59, Jaggar teaches the claimed invention as described above. However, Jaggar does not clearly disclose that the logic circuitry includes at least one of a programmable gate array (PGA) or a field programmable gate array (FPGA). Rangan, on the other hand, teaches that FPGAs are well-known integrated circuits that provide the advantages of fixed integrated circuits with the flexibility of custom integrated circuits. Such devices allow a user to electrically program standard, off-the-shelf logic elements to meet a user's specific needs (e.g. see Col. 3, lines 40-46). Accordingly, it would have been obvious to one of ordinary skill in the art at the time of the current invention was made to include FPGA as taught by Rangan in the logic circuitry of Jaggar to achieve the advantages as described above.

Remarks

8. As to the remark, Applicant asserted that with regards to independent claim 1,

(a) Jaggar fails to show, teach or suggest a register file for a data processing system comprising an unbanked memory unit having a plurality of registers addressable by an encoded address. Instead, as best understood by Applicants, Jaggar discloses a banked register structure.

(b) Jaggar fails to disclose the limitation of an unbanked memory unit having a plurality of registers addressable by an encoded address.

(c) Jaggar is absent of any teaching or suggestion of an unbanked memory unit that includes a plurality of registers addressable by encoded addresses, and instead is directed to a banked architecture that accesses banked registers in separate memory units.

(d) Figs. 2 and 9 of Jaggar disclose the banked memory architecture. Fig. 9 appears to disclose different banks of registers for User32, System, FIQ32, SVC32, Abt32, IRQ32 and Undef32 modes.

Examiner respectfully traverses Applicant's remark for the following reasons:

With respect to (a)-(d), Examiner first would like to point out to Applicant that according to paragraphs [003]-[007] of the specification of the current application, broadly, the "banked" general purpose registers means there are one or more registers specified for use in specific processing mode; and the "unbanked" general purpose registers means all registers are usable for different processing modes based on the processing mode encoded in the address. In Jaggar prior art, all (0000-1111) registers are usable based on processing mode selected by the mode bits. Therefore, Jaggar prior art does teach the unbanked memory unit (i.e. the stack memory area having 0000-1111 registers/memory locations) addressable by an encoded address (i.e. the combination of register address and the mode bits, 17 in Figs. 1 and 8), wherein the encoded address corresponds to a respective one of the plurality of registers (i.e. registers R0-R13 in Figs. 1 and 8) and a corresponding processor mode (i.e. a user mode and system mode) (e.g. see the abstract and Figs. 1 and 8). Fig. 9 of the Jaggar

prior art shows that all 16 registers are usable/available for all modes (i.e. the user mode and exception modes) it is different from the Fig. 1 of the current application because only specific (not all) registers are usable for a given processing mode.

Conclusion

9. **THIS ACTION IS MADE FINAL.** Applicant is reminded of the extension of time policy as set forth in 37 CFR 1.136(a).

A shortened statutory period for reply to this final action is set to expire THREE MONTHS from the mailing date of this action. In the event a first reply is filed within TWO MONTHS of the mailing date of this final action and the advisory action is not mailed until after the end of the THREE-MONTH shortened statutory period, then the shortened statutory period will expire on the date the advisory action is mailed, and any extension fee pursuant to 37 CFR 1.136(a) will be calculated from the mailing date of the advisory action. In no event, however, will the statutory period for reply expire later than SIX MONTHS from the mailing date of this final action.

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Hetul Patel whose telephone number is 571-272-4184. The examiner can normally be reached on M-F 8-4:30.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Matt Kim can be reached on 571-272-4182. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see http://pair-direct.uspto.gov. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

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